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faint traces of two smaller and shorter tails, one on each side, diverging at a greater angle from the nucleus, and resembling some of the appearances figured by Schröter in 1811. This, however, was not confirmed by the telescope, nor did he see it on the following nights. He traced the same faint indications of a hollow structure in the train, especially on March 30th. On April 3d, and subsequently, they had become less evident. Coruscations appeared to him to be distinguishable both by the naked eye and with the telescope."

Photographic Pictures of the Moon taken with the Equatoreal of the Liverpool Observatory. By John Hartnup, Esq.

Mr. Hartnup exhibited ten collodion pictures of the moon, of 1·35 inches diameter, and ten enlarged copies, taken from the originals, which varied from 2 to 4½ inches in diameter.

The photographs were all taken during the preceding month; and Mr. Hartnup stated that he only looked upon the progress now made as one step towards that degree of perfection which he had every reason to hope he should shortly arrive at.

In taking the pictures, the clock was so regulated that the telescope followed the moon in right ascension nearly; then, the hour-circle and the declination-circle being both clamped, the image of the moon was kept as nearly as possible in the same place, as seen in the finder, by means of the rods for giving slow motion to the instrument in right ascension and declination. The circles are each four feet diameter; the slow motion is given by means of tangent screws; and the instrument is so firmly mounted as to render the task of correcting for irregular motion of clock, change of moon's declination, and change arising from differences of refraction and parallax during the operation, comparatively easy.

The chemicals employed were those ordinarily used for taking a positive collodion picture on glass; and Mr. Hartnup acknowledged the great obligation that he was under to Messrs. Forrest, Berry, Edwards, M'Innes, and Towson, of the Liverpool Photographic Society, for the kind advice and assistance which he had from time to time received from them.

Of the photographs exhibited there were two (one taken before and one after the full), which, when placed in the stereoscope so as to be seen as one image, the appearance was that of a semi-transparent globe, the effect being perfectly stereoscopic. The enlarged pictures were shown on a screen by means of a magic lantern, kindly supplied for the occasion by Mr. Simms. Most of them were too large for the lens, so that only a portion of the picture could be seen at the same time on the screen, though it was eight feet diameter. There was, however, one photograph of a half moon, and one of a full moon, small enough for the screen; and these pictures were much admired. The President alluded to the gratifying progress of Mr. Hartnup's labours in connexion

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with this interesting subject. At the same time he took occasion to point out the imperfect definition of the inequalities on the bright limb of the moon, and remarked that this was a defect of photographic representations, which placed them in strong contrast with the results of direct observation. To devise adequate means for remedying this defect was one of the principal objects to be aimed at in such experiments, and it was an essential element of success that there should be a contrivance for applying an equable and smooth motion to the surface destined to receive the photographic impression.

Mr. Burr states, in reference to his observation of the occultation of Mars inserted in the last *Monthly Notice*, that the estimated longitude of his observatory is $23^{s}\cdot8$ W.

Account of Observations of the Total Eclipse of the Sun of November 30, 1853, *made at Ocucaje, in Peru.* By M. Carlos Moesta.*

(*Communicated by Admiral W. H. Smyth.*)

The author of this account, who is Director of the National Observatory at Santiago, Chili, was appointed by the Chilian Government to proceed to the neighbouring republic of Peru for the purpose of making observations of the total eclipse of the sun which was to occur on the 30th of November, 1853.

By a graphic delineation, based upon the results given in the *Nautical Almanac*, M. Moesta found that the central line of the totality of the eclipse would enter the coast of Peru from the Pacific at a point situated in long. 76° 2′ west, and lat. 14° 27′ south. Pisco was the nearest town to this part of the coast, but M. Moesta resolved to observe the phenomenon at some convenient place in the interior, elevated as much as possible above the level of the sea.

The various instruments required for observing the phenomenon were obtained from the Observatory of Santiago. Among these was an achromatic refractor of 4½ inches aperture and 5⅓ feet focal length, by Frauenhofer, furnished with a reticulated micrometer adapted for measuring differences of right ascension and declination, and also angles of position. Another telescope, a refractor, by Dollond, of 2¾ in. aperture and 3½ feet focal length, was used by M. Lira, the assistant of the Observatory, who accompanied the author in his expedition. Besides these two instruments, the Observatory furnished for the observation of the phenomenon a reflecting circle by Ertel, divided to every 10″, fitted with two

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* This Report was originally drawn up by M. Moesta and presented to the Minister of Public Instruction of the Chilian Republic.

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